cellSens functions

		Dimension	Standard	Entry
Layout	User experience customization	✓	✓	✓
View	Overlay multiple images	✓	✓	
	Document groups for side-by-side image comparison	✓	✓	✓
	Movie playback	✓	✓	✓
	Tile view (multiple images in a single data set shown side by side)	✓	✓	✓
	Slice view for orthogonal plane viewing of 3D or time-lapse data sets	✓		
	Voxel view for isosurface and volumetric rendering of 3D and 4D data sets	✓		
Image Acquisition	Snap/movie acquisition	✓	✓	✓
	Time-lapse at specified interval	✓	✓	
	Automated multi-wavelength	✓	Multichannel Acquisition	
	Z-Stack	✓		
	Multi-dimensional (*xyzt* and wavelength)	✓		
	Graphical Experiment Manager	✓		
	Manual assisted panoramic imaging (manual MIA)	✓	Manual Process	
	Multiposition acquisition and stage navigator	Multiposition		
	Automated panoramic imaging (auto MIA, requires motorized stage)	Multiposition		
	Instant EFI image (manual or motorized Z)	✓	Manual Process	
	Simultaneous multi-color imaging (Image splitter needs)	Ratio/High End Device		
	Live deblurring	✓		
	High Dynamic Range Imaging (HDRI)	✓		
	Multi-well Plate Acquisition	Well Plate Navigator and Multiposition		
Image Processing	Geometry/combine/filter processing	✓	✓	
	Fluorescence unmixing	✓		
	Brightfield unmixing	✓		
	Deblurring (No/Nearest Neighbor, Wiener Filter)	✓		
	2D deconvolution (constrained iterative deconvolution)	✓		
	3D deconvolution (constrained iterative deconvolution)	CI Deconvolution		
Image Analysis	Region and line measurements	✓	✓	
	Phase analysis	✓		
	Object analysis and classification	Count & Measure		
	Interactive measurement	✓	✓	✓*
	Intensity plot over time/z	✓		
	Colocalization	✓		
	Object Counting (Manual)	✓	✓	
	Online Ratio and Kinetics	Ratio		
	Ratio analysis (off-line)	✓		
Documentation and Collaboration	Automatically compose Word reports	✓		
	Database image and data management solution for microscopy	Database Core	Database Core	
	Save and load images/documents from Database	Database Client	Database Client	Database Client
Remoting	Remote Live Image Viewing	NetCam	NetCam	

* Three points angle, four points angle, arbitrary line, closed polygon, polyline and perpendicular line only.

Products with confirmed functionality

			Dimension	Standard	Entry
Olympus	Camera	DP20*1, DP21, DP25, DP26, DP70*1, DP71*2, DP72, DP73*3, DP80*3	✓	✓	✓
	Microscope	BX43, BX53, BX63, BX61, BX61WI, IX83, IX73, IX81, SZX16A	✓	✓	
		IX81-ZDC, IX81-ZDC2, IX3-ZDC	✓		
	Peripherals	BX-DSU, IX3-DSU, IX2-DSU, U-CBF	✓		
	Motorized XY stage	BX3-SSU, IX3-SSU	Multiposition		
Olympus Soft Imaging Solutions	Camera	CC12, F-View II, Colorview I, Colorview II, Colorview III, Colorview IIIu, XM10, XC10, XC30, XC50, UC30, UC50, SC20, SC30, SC100	✓	✓	✓
	Peripherals	cell^TIRF (multi-line, single line), MT20, USB-ODB converter, Real Time Controller (U-RTC and U-RTCE), U-FCB	✓		
Hamamatsu	Camera	Orca R2 (C10600-10B), Orca 03 (C8484-03G), Orca 05 (C8484-05G), Orca ER (C4742-95-12ER), Orca Flash 2.8	✓		
		ImagEM C9100-13, ImagEMX2(C9100-23B), ORCA-Flash 4.0 V2(C11440-22CU)	High-End Camera		
Q-Imaging	Camera	MicroPublisher 3.3 RTV, MicroPublisher 5 RTV	✓	✓	
		Monochrome: Exi Blue/Aqua, RETIGA (Exi, SRV, 2000R, 2000RV, 4000R, 4000RV, 6000_mono) QICIick plus RGB slider	✓		
		Color : Exi Aqua			
		Rolera Thunder	High-End Camera		
Photometrics	Camera	CoolSNAP HQ2	✓		
		Evolve 512 Delta	High-End Camera		
	Image Splitter	Dual View DV2 /QuadView QV2	Ratio/High End Device		
Andor	Camera	iXon X3 897, iXon Ultra 897, Zyla4.2	High-End Camera		
Jenoptik	Camera	ProgRes C3, ProgRes C5	✓	✓	
Vincent Associates	Shutter	Uniblitz shutter (VCM-D1, VMM-D1, VMM-D3)	✓	✓	
CoolLED	Light Source	precisExcite (pE-1, pE-2)	✓		
Lumen Dynamics	Light Source	X-Cite 120 PC, X-Cite *exacte*, X-Cite XLED1	✓		
Sutter	Light Source	Lambda DG4	✓		
	Shutter, FW	Lambda 10-3/10-B	✓		
Prior	Motorized XY stage	Proscan (I, II, III), Optiscan	Multiposition		
	Shutter, FW, Z-drive	Proscan (I, II, III), Optiscan II	✓		
	Piezo Z (control via Real Time Controller)	NanoScanZ NZ100	High-End Device		
Ludl	Motorized XY stage	Mac 6000	Multiposition		
	Shutter, FW, Z-drive	Mac 6000	✓		
Objective Imaging	Motorized XY stage controller	Oasis 4i	Multiposition		
	Z-drive controller	Oasis 4i	✓		
Märzhäuser	Motorized XY stage	Tango	Multiposition		
	Z-drive controller	Tango	✓		
Physik Instrumente	Piezo Z (control via Real Time Controller)	PIFOC P-721	High-End Device		
Yokogawa	CSU	CSU-X1	High-End Device		

*1 DP20/70 does not support Windows7 64bit, Windows 8 32bit/64bit. *2 DP71 does not support Windows8 32bit. *3 DP73/80 support only Windows7/8 64bit.

Compatible image formats

Read and write	JPEG, JPEG2000, TIFF, BMP, AVI, PNG, VSI (Virtual slide image),
Read only	GIF, PSD (Adobe Photoshop), TIFF (DP-BSW, FSX100, MetaMorph), OIF/OIB (Fluoview format), Cell, STK (MetaMorph), MRC (Medical Research Council)

Recommended system requirements

OS	Microsoft Windows 8 (32-bit/64-bit) Pro, Microsoft Windows 7 (32-bit/64-bit) Ultimate with SP1, Microsoft Windows 7 (32-bit/64-bit) Professional with SP1
OS Language	English, Simplified Chinese, Japanese, German, Russian (only for Entry and Standard) and all others with English like alphabet
CPU	Intel Core i5, Intel Core i7, Intel Xeon Recommended for high speed image acquisition: QuadCore
RAM	4 GB Recommended for high speed image acquisition: 8GB or more only on Windows7 64-bit operating system
Graphic card	1280x1024 (min. 1024 x768) monitor resolution with 32-bit-video card with separate graphics memory (no integrated graphics processor with shared memory)
Port	USB 2.0 port to connect devices to the system Fire Wire A to connect devices to the system (BX61, IX81, SZX2-MDCU, IX3-DSU etc...) Serial (RS232) to connect devices to the system (BX61, IX81, SZX2-MDCU etc...) Additional PCI/PCIe slots as necessary to connect third party peripherals (principally third party cameras) with proprietary interface cards
HDD	1 GB for installation Performance of hard disk is a limiting factor for image acquisition speed Recommended for high speed image acquisition: Solid State Drive (SSD)
Drive	DVD drive (Read: DVD-R DL)
Web Browser	Recommended for Windows 7: Microsoft Internet Explorer 8.0, 9.0, Recommended for Windows 8: Microsoft Internet Explorer 10

Image data courtesy of:
Hiroo Ueno, Ph.D.
Department of Stem Cell Pathology, Kansai Medical University
(cover page)

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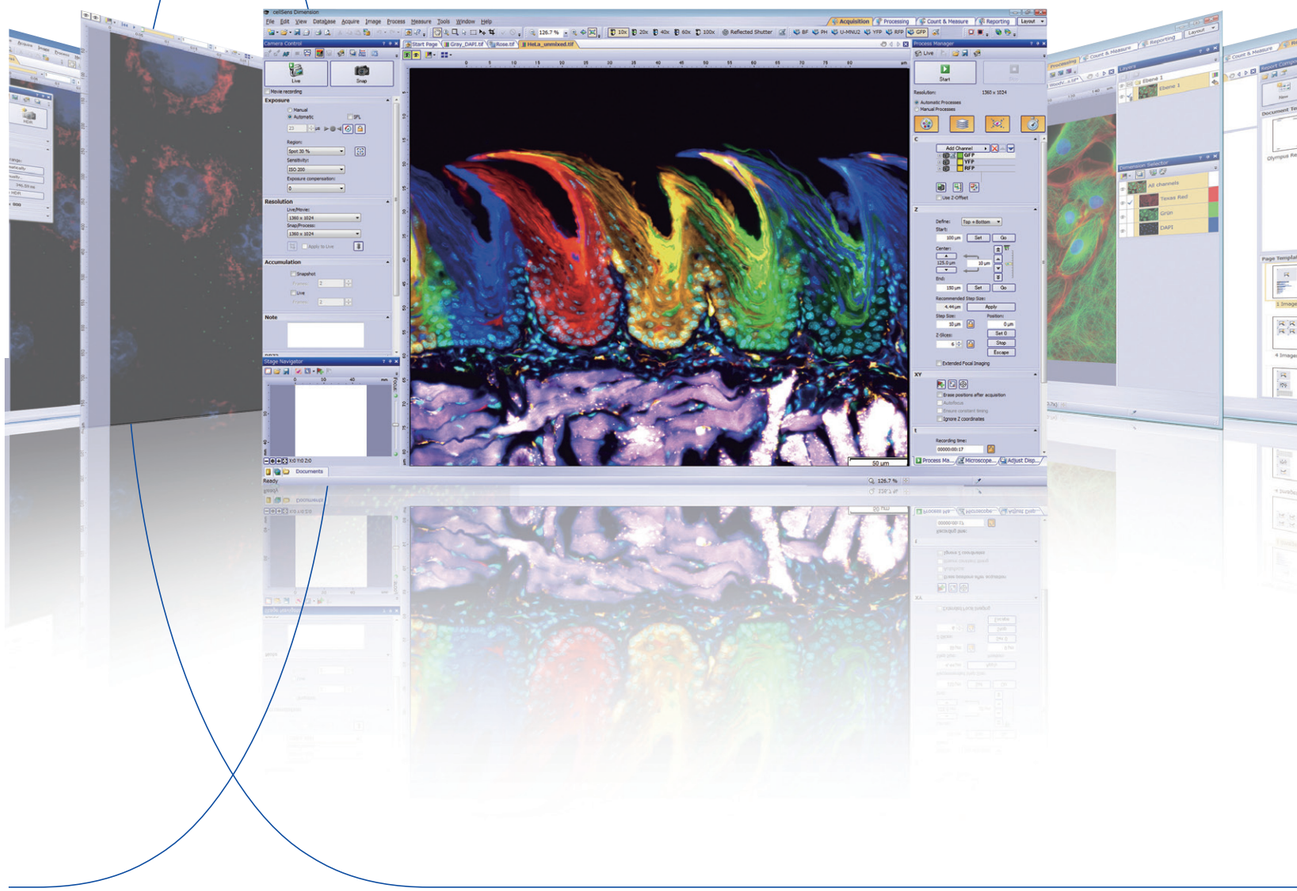
OLYMPUS®
Your Vision, Our Future

Imaging Software

cellSens

Seamless Workflow. Intuitive Operation.



Not for clinical diagnostic use.

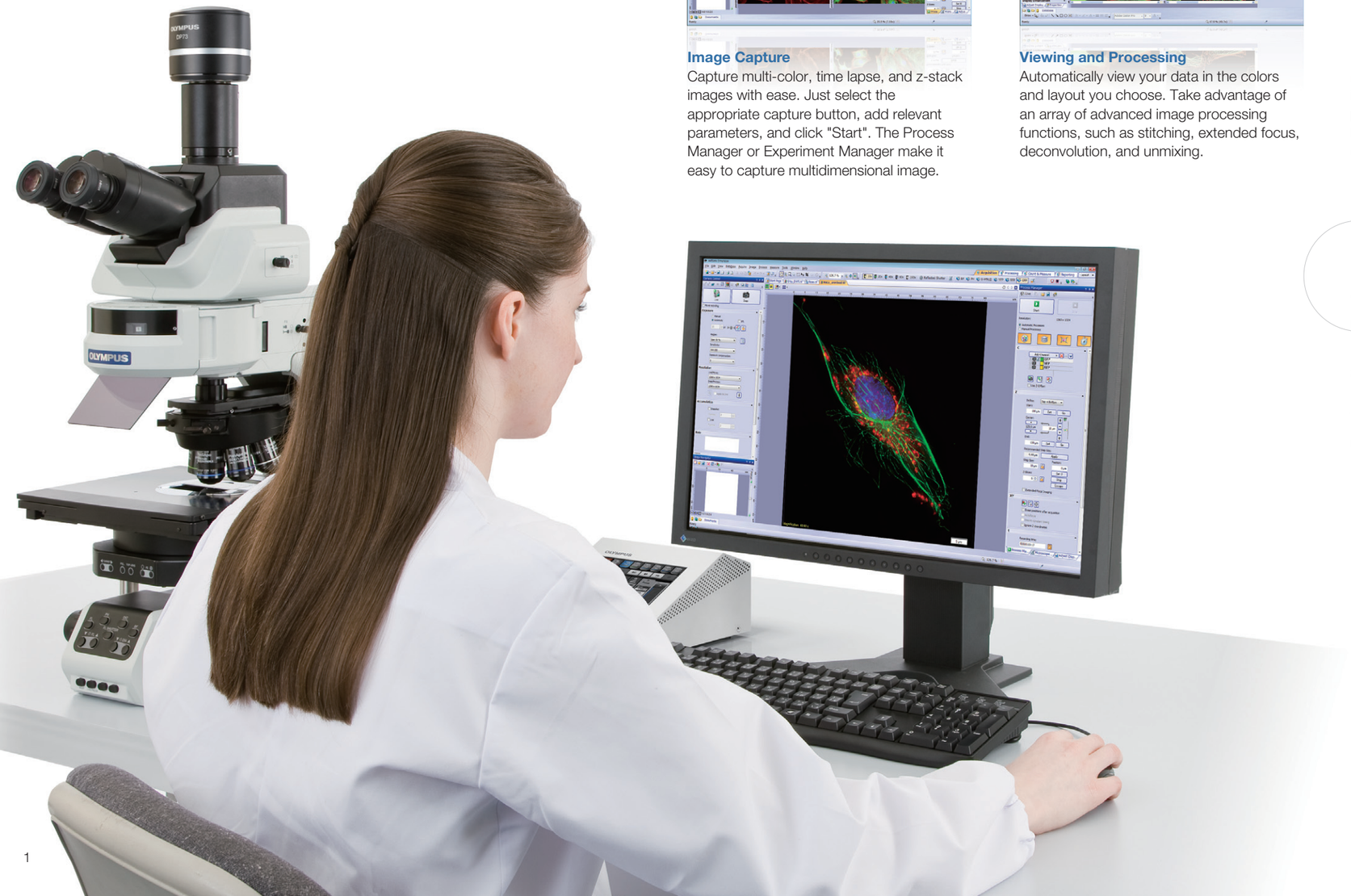
ADD SIMPLICITY TO EXPERIMENT DESIGN...
LEAVE MORE TIME FOR RESEARCH

Olympus cellSens gives you a simpler way to work.

Enjoy full control over the user interface, with functions that are where you want them, when you need them.

Seamless operation, from image capture to report creation means more results with less effort.

Spend less time with your software. Have more time for research.



Imaging

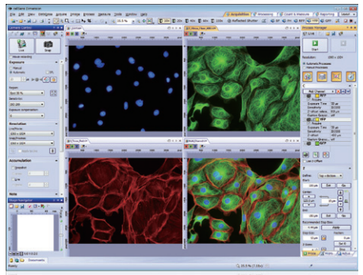
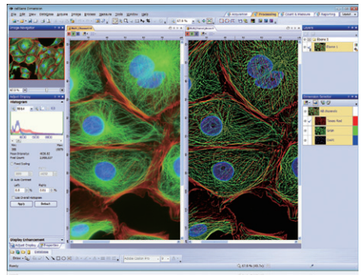


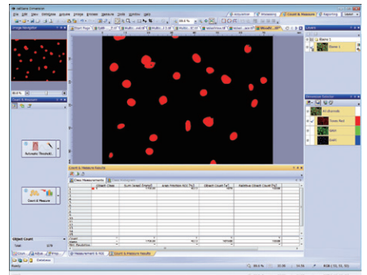
Image Capture
Capture multi-color, time lapse, and z-stack images with ease. Just select the appropriate capture button, add relevant parameters, and click "Start". The Process Manager or Experiment Manager make it easy to capture multidimensional image.

Processing



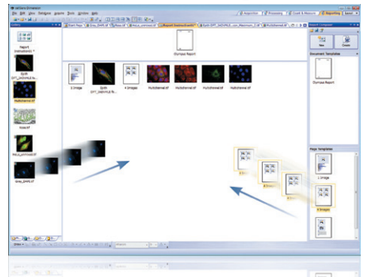
Viewing and Processing
Automatically view your data in the colors and layout you choose. Take advantage of an array of advanced image processing functions, such as stitching, extended focus, deconvolution, and unmixing.

Analyzing



Measurement and Analysis
Make measurements using an intuitive interface. cellSens offers region of interest, phase analysis, and cell count capability. Export raw measurement data to MS Excel or a cellSens workbook with a single click.

Reporting



Collaboration and Communication
Actively collaborate with colleagues and coworkers with special tools including Database and Reporting functions. These functions make it simple to manage, share, and distribute your own image and data reports.

Microscopy Research With a Personal Touch

With microscope optics pushing the boundaries of resolution and size at all magnifications and microscope design enabling new techniques, it is important to be able to efficiently capture and process the images produced. In addition, an increasing number of researchers are imaging using a microscope and it is therefore essential that imaging and analysis are both flexible and user-centric. The Olympus cellSens software family fulfils all these requirements with its unique personalisation concept.

REDUCE CLUTTER AND CONFUSION BY DISPLAYING ONLY THE TOOLS AND WINDOWS YOU NEED

It's Time to Get Personal

Olympus has been at the forefront of microscopy for over 90 years and has developed microscopes and systems for a broad spectrum of applications. As a result, we know that each researcher has individual requirements that can't all be met by fixed solutions. The cellSens software family consists of three packages, all featuring a peerless user-definable interface. As a result, each user can define what they want cellSens to show them within the defined work areas.

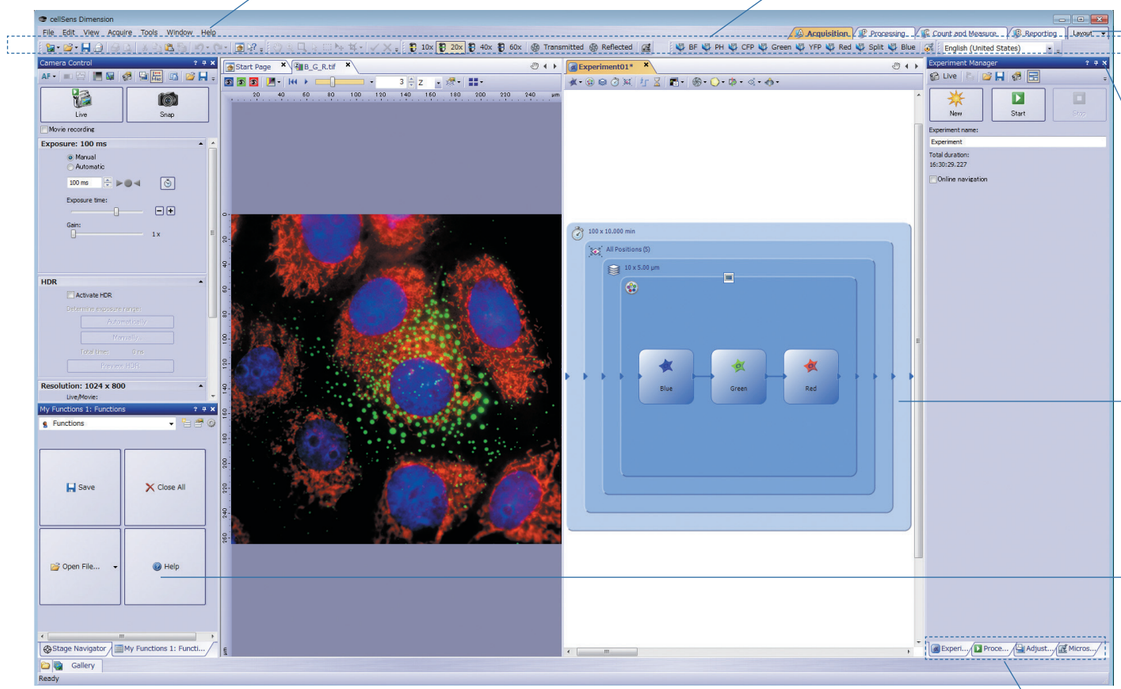
Dynamic Interface

Creating an efficient workflow requires careful definition of the tasks and tools at each stage. With the cellSens platform's dynamic GUI, the same is true—the tools you need for each stage are clearly available, without clutter or the need to search. Olympus has created a number of interface layouts, which are developed with capabilities appropriate to the users needs.

- **Acquisition Layout**—for selecting between different acquisition processes and adjusting the camera settings
- **Processing Layout**—for post-acquisition functions such as image processing, execution of measurements, collection of data, presentation of resulting statistics
- **Count & Measure Layout**—for manual and automated measurement and object counting
- **Reporting Layout**—for generating reports to document and share results.
- **Create Layout**—a user can define his or her own layout in various arrangements

Camera Control Panel

The most important microscope component that requires software control when imaging is the digital camera. Modern cameras feature a number of functions that can be changed to enhance or perfect an image; for example, exposure time and pixel binning. The cellSens Entry and Standard packages control such features on all Olympus digital microscopes and cameras.
The Dimension package, in addition, controls such features on high-end research cameras as well. As a result, scientists can maximize the quality of their images.



Need Help? Online Help is Just a Click Away

Display Only Those Functions You Need on the Toolbar

Common Functions can be Grouped in a Single Tab

All necessary functions are placed where you want, when you need them. Layout tabs allow easy selection of functions according to your workflow. For instance, display camera control features in your Acquisition layout, and then remove them from view when you switch to the Processing layout.

Display or Hide Windows as You Require, or Use Auto-hide for Clean Operation

Graphical Experiment Manager (GEM)

GEM enables the design of complex experiments by simply dragging and dropping icons onto the canvas.

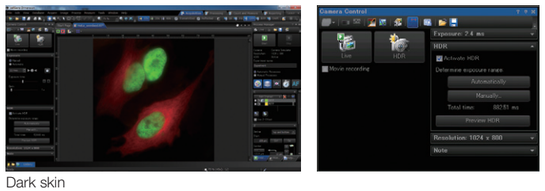
Create Flexible Workflow Toolbars for Repetitive Operations

cellSens lets you create custom toolbars for your most frequently used functions and then save them to the My Functions window. Custom buttons are also easy to use, with convenient tab access that further enhances workflow efficiency. Furthermore, appearance of each toolbar in the My Functions window can be customized by choosing an icon and/or text from Button Appearance window.

Functional Panels are Grouped in Tabs for Easier Access

Dark Application Skin

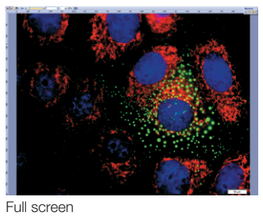
The Dark Application Skin reduces computer monitor-generated ambient light and allows cellSens users to adapt to darkened environments; icon contrast remains high for easy recognition and quick selection.



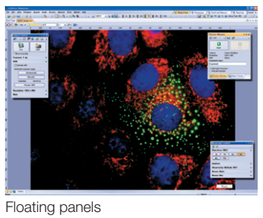
Dark skin

Arrange Windows as You Like

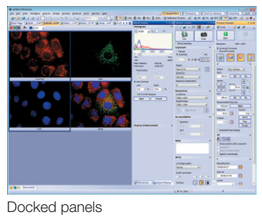
Organize the tools and windows for the job at hand to create a functional layout that works best for you.



Full screen



Floating panels



Docked panels

EMPOWERED TO DO WHAT YOU WANT

What Researchers Wanted

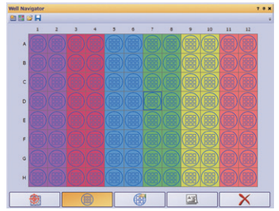
Our Solutions

Complex experimental procedure with flexible design

Graphical Experiment Manager (GEM)
This function allows experiments to be designed with even greater versatility. Furthermore, image acquisition is available for up to 6 dimensions (XYZT λ multipoint).

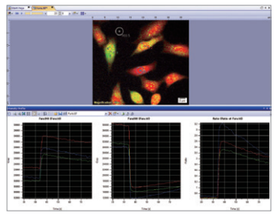
Flexible well plate image capture

Well Plate Navigator
Capture well plate samples automatically by using the well plate navigator in combination with the motorized stage. There is also enhanced flexibility to allow multiple experiments to be executed within a single well plate.



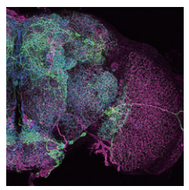
Intensity analysis

Intensity Analysis
Visualize changes in intensity over time, and save this information for later analysis. Ratio Analysis function allows calibration, display and analysis of live/stored data reflecting changes in the intensity ratio between two acquisition channels.



Improved image detail

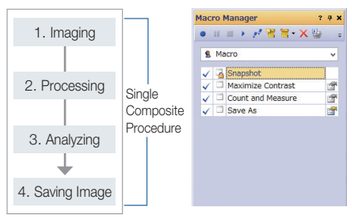
Deconvolution
Choose between included 2D blind deconvolution and optional 3D blind deconvolution. This proprietary and highly efficient post-processing tool for both CCD and Confocal imaging enhances the ability to differentiate between imaged objects.



Kei Ito, Ph. D.
Institute of Molecular and Cellular Biosciences, University of Tokyo

Unified task order management

Macro Manager
Perform tasks, from imaging to processing and analysis, as a single composite procedure. Batch processing is also available, enabling multiple images to be subjected to preferred processes as a continuous series for a significant improvement in workflow efficiency.

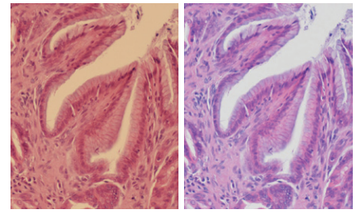


What Medical Researchers Wanted

Our Solutions

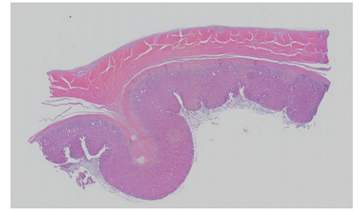
Retention of intact observed images

Live/Snapshot Function with White Balance Adjustment
Simply align the focus and select the appropriate white balance to capture images with true-to-life quality.



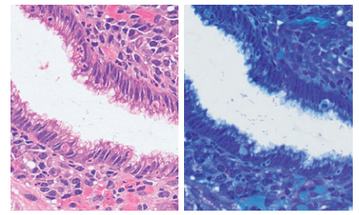
Observe large sample at once

Panoramic Imaging
Create clear and seamless wide area images by automatic correction of mismatching between each images, even when using the manual stage. A fully functional wide-area focus map enables improved clarity in panoramic imaging.



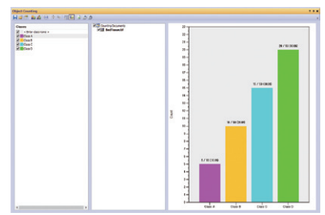
Simultaneously monitoring of multiple images

Image Comparison (simultaneous image windows)
Display images side by side for accurate comparison, with simultaneous zooming and movement.



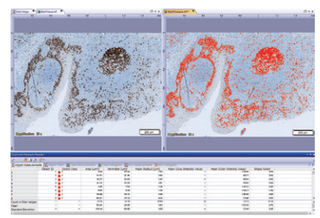
Cell counting by hands

Object Counting
Perform manual counts with self-set classes. Counts and proportions can then be undertaken for each class through simple mouse operation.



Nuclei counting with variable thresholding

Particle Analysis
Set threshold levels for nuclei counts, or calculate parameters such as tissue slice total area and area ratios.



AN ARRAY OF EASY-TO-USE FUNCTIONS TO TURN RESEARCH FINDING INTO COMPELLING PRESENTATIONS

Image Capture

Graphical Experiment Manager (GEM)

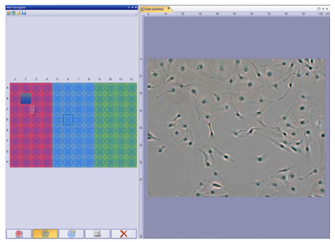
Dimension

Achieve a high flexibility in the design of experiments, with capabilities such as changing imaging conditions. Furthermore, using the High-end Device Solution provides compatibility with image splitting and piezo devices helps simultaneous two-color imaging and high-speed z-stack image acquisition.

Well Plate Navigator

Dimension + Multiposition + Well Plate Navigator

The Well Plate Navigator Solution allows you to automatically scan and acquire images from different plate formats, either standard or customized. All acquired images can be saved into a structured database for easy access, together with their well position and user comments. Settings for imaging conditions can also be varied for individual wells, by column, by row or arbitrarily.



Extended Focus Imaging

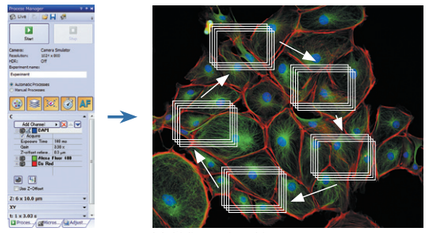
Dimension
or
Standard + Manual Process

By recording image data while the user gradually focuses through its sample the EFI function automatically creates a single all-in-focus image. The EFI process can be fully automated when cellSens Dimension is integrated into a motorized microscope. Such EFI composites can also be created by combining collections of previously captured images.

Capture Multidimensional Images

Dimension + Multiposition

In combination with a motorized microscope, the Process Manager makes it easy to capture multi-color and multidimensional images. With the optional Multiposition Solution you can automatically capture multi-point and large area images.

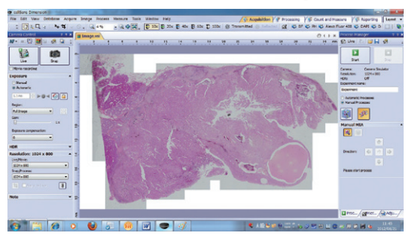


Multidimensional images

Panoramic Imaging

Dimension + Multiposition
or
Standard + Manual Process

The manual multiple image alignment function creates a single montage image as you scan the specimen. Multiple saved images with adjoining edges can also be combined into a single montaged image. Wide area imaging can be completely automated when cellSens Dimension and its optional Multiposition Solution are combined with a motorized microscope. This function can also be used in combination with a motorized z-focus to enable the capture of images auto-corrected for sample distortion and tilting.
With the release of cellSens v.1.11, a multi-point focus map is now available to enable automated focusing across wide image areas.

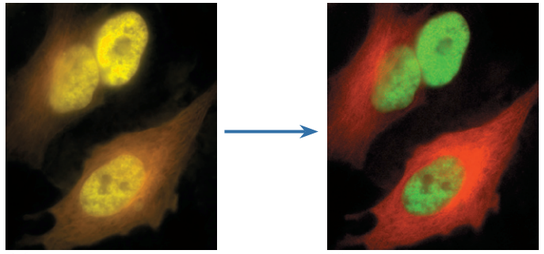


Viewing and Processing

Unmixing

Dimension

With the linear unmixing algorithm in cellSens Dimension, you can readily separate fluorochromes which overlap in their emission spectra—such as GFP and YFP—to produce crosstalk-free fluorescent images. This linear unmixing tool can also separate autofluorescence-related background. Brightfield image unmixing is also available as part of cellSens Dimension.

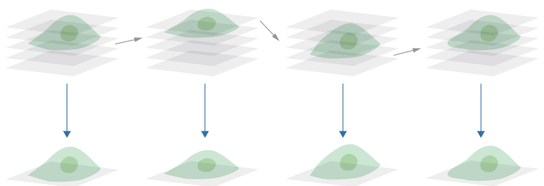


Before unmixing — After unmixing

Best Focus Extraction

Dimension

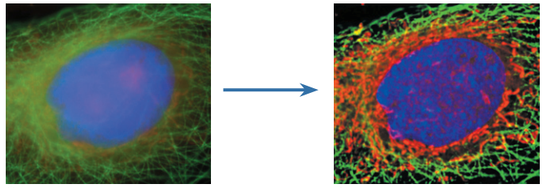
Extract the best focus from images, including z-stack, time-lapse images. This function is effective in creating T-series images with the best focus possible, even when working with defocused time-lapse images.



Deconvolution

Dimension + CI Deconvolution

cellSens Dimension includes a Live 2D deblurring algorithm for live preview and acquisition, to enable better focusing on thick specimens. Additional deconvolution techniques are available in cellSens to reassign out-of-focus light. The optional CI Deconvolution Solution employs the latest in Constrained Iterative Deconvolution technology to produce improved resolution, contrast and dynamic range with industry-leading speed.



Original image — Deconvolved image

High Dynamic Range Imaging (HDRI)

Dimension

By automatically capturing many images at different exposures the HDRI function creates a final image with a much greater dynamic range, where low intensity signals are clearly visible without overexposing the bright areas of the sample.

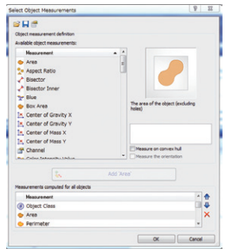
AN ARRAY OF EASY-TO-USE FUNCTIONS TO TURN RESEARCH FINDING INTO COMPELLING PRESENTATIONS

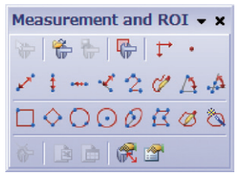
Measurement and Analysis

Manual Measurement

Dimension
or
Standard
or
Entry

Depending on the cellSens package different measurements are easily accessible, including distance between points, areas, intensity measurements and morphological parameters. Measurement data is saved as an image layer that can be exported to MS Excel and cellSens workbook formats, or viewed using OlyVia the free image viewer software.

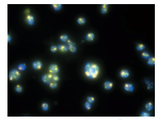


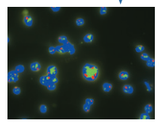


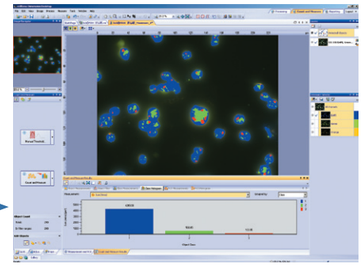
Automatic Object Measurement and Classification

Dimension + Count & Measure

cellSens Dimension has an extensive set of manual measurements that can be further expanded with the Count & Measure Solution. Easily perform automatic object measurement and classification in an interactive interface where recognized objects are always linked with their measurements.


Original image

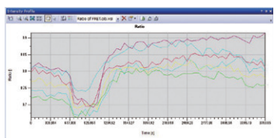

Object detected on image


Measurement and classification results

Intensity Analysis

Dimension

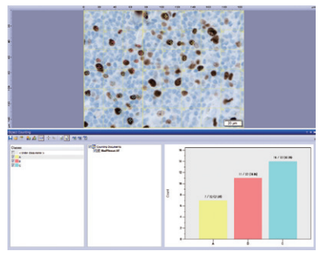
Graphically depict intensity and channel ratios, and export values to Excel or WorkBook by simply setting the region of interest (ROI) on multi-color images captured via FRET or $Ca2^{+}$ imaging. Finer details of cell structures can also be brought into clear view through the use of ratio display, thanks to the intensity modulated display (IMD) that displays ratios and intensity in terms of hues and brightness. Furthermore, the ROI can be moved to capture measurements in line with cell movements, and online analysis is made possible through selection of the ratio option.



Manual Count

Dimension
Standard

Perform manual counts with self-set classes. Counts and proportions can then be undertaken for each class through simple mouse operation.



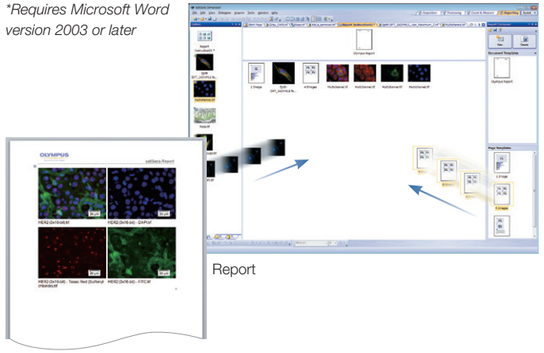
Collaboration and Communication

Reporting

Dimension

A convenient Reporting tool combines images with image property data, measurement data and your own customized fields into a report template with easy drag-and-drop operation. These Microsoft Word* reports will let you quickly and easily collaborate with colleagues and communicate your results.

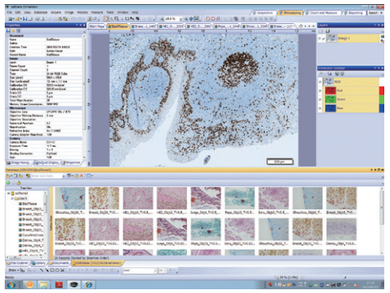
**Requires Microsoft Word version 2003 or later*


Report

Database

Dimension + Database Core or Database Client
Standard + Database Core or Database Client
Entry + Database Client

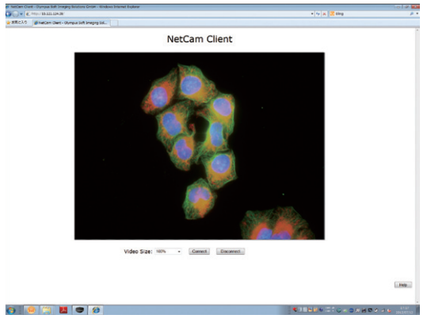
The Database Core Solution allows the creation of user-defined databases, with full access control, which can be shared across a network. The database not only collects images but also all associated image properties, user comments and any kind of related file, like spreadsheets for other documents. An interactive query tool makes it easy to find the desired data, with automatic preview of the found images. With the Database Client Solution you can then conveniently deploy the capability to read and write to the shared database across many different stations.



Remote Live Image

Dimension + NetCam
Standard + NetCam

The cellSens NetCam Solution lets any authorized network user see your live image in real time via a web browser.



Solution

Each cellSens Package can be expanded towards a specific application by using optional “Solutions”

Dimension available solutions:
CI Deconvolution | Multiposition | Well Plate Navigator
Count & Measure | Ratio | Database Core
Database Client | NetCam

Standard available solutions:
Multichannel Acquisition | Manual Process | Database Core
Database Client | NetCam

Entry available solution:
Database Client